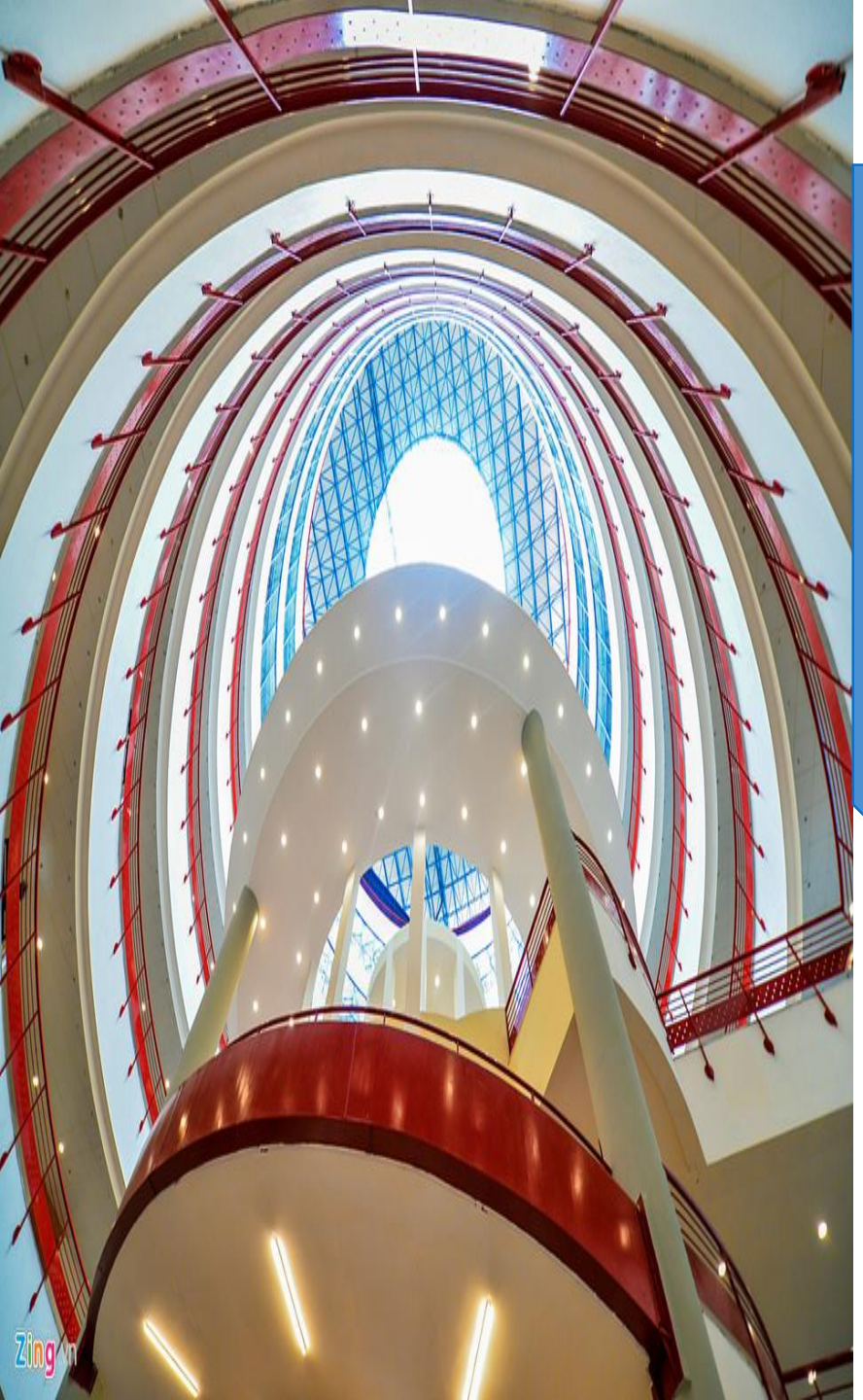


DATA DRIVEN MARKETING

Department of Mathematical Economics

Nguyễn Thị Quỳnh Giang qgiang.nguyen@gmail.com

National Economics University
https://www.neu.edu.vn/

Required Textbook and Course Materials

- Textbook:

  - Hwang, Yoon Hyup (2019). Hands-on data science for marketing: improve your marketing strategies with machine learning using Python and R. *Packt Publishing*

  - Jeffery, Mark (2012). Data-Driven Marketing (The 15 Metrics Everyone in Marketing should Know). *John Wiley & Sons, Inc*. https://doi.org//10.1002/9781119198666

- PRE-REQUISITE
  - Machine Learning 1
  - Data Preparation and Visualization
- You will require Python installed to run most of the code throughout this book

Course Details

- Chapter 1: Data Science and Marketing
- Chapter 2: Key Performance Indicators and Visualizations
  - Understand commonly used KPIs such as Sales Revenue, Cost per Acquisition, ROI…
  - Compute and visualizing KPIs using Python
- Chapter 3: Using Regression Analysis for explanatory analysis
  - Using regression analysis for explanatory analysis
  - Regression analysis with Python
- Chapter 4: From Engagement to Conversion
  - Build decision tree models using the scikit-learn package
  - Interpret the results via visualizations using Python's graphviz package

Course Details

- Chapter 5: Product Analytics
  - Analyze the time series trends in the revenue and the numbers of purchase orders using e-commerce business data
  - Analyze the patterns of repeat customers and their contributions to overall revenue
  - Analyze the behaviors of best-selling products
- Chapter 6: Recommending the Right Products
  - Understand what is a product recommender system
  - Discuss the two approaches, collaborative filtering and content-based filtering to building product recommendation systems
  - Implement collaborative filtering algorithms for product recommendations

Course Details

- Chapter 7: Predicting the Likelihood of Marketing Engagement
  - Discuss common use cases of predictive analytics in marketing
  - Build random forest model to predict whether a customer is going to respond or engage with the marketing campaign
- Chapter 8: Customer Lifetime Value
  - Understand what is CLV, its importance and usage in marketing
  - Build regression models that predict the CLV over the course of a 3 month period

Course Details

- Chapter 9: Data Driven Customer Segmentation
  - Use k-means clustering algorithm to build customer segments based on the historical data
  - Draw insights from the results of the clustering analysis using scatter plots and cluster centroids
- Chapter 10 : A/B Testing for Better Marketing Strategy
  - Test your hypothesis using statistical hypothesis testing
  - Evaluate A/B testing results

Chapter 1: Data Science and Marketing

Trends in Marketing

- **Rising importance of digital marketing**: lots of marketing activities are now have rising on digital channels such as **search engines, social network, email and websites**.

- **Marketing Analytics**: a way of **monitoring** and **analyzing** the performances of marketing efforts. Examples:

  - Measure how much you gain from marketing
  - Which type of customers drives the revenue for your business?
  - Which content attracts the users the most and what the trends in keyword searches are
  - Which channel attracts more customers

- **Personalized and Target Marketing**: sell the Right Product to the Right Customer at the Right time.

Trends in Marketing

- The overall trends in marketing have been toward more data-driven and quantitative approaches
- According to February 2020 CMO survey, the reliance on marketing analytics has gone up from 30% to 42% in the past 5 years
- The number of firms using quantitative tools has increased by 28% in the past 5 years
- The CMO survey suggests that the percentage of companies utilizing artificial intelligence and machine learning is expected to increase to 39% over the next 3 years

Benefits of data driven marketing

- **Personalized, highly-targeted campaigns**
  - Create unique, personalized messaging for each customer
  - Give you insight into each customer: their interests, lifestyle, online activity
  - Guide your content marketing strategy
  - Let you know where and when to post ads and marketing material
- **Improve your product development**
  - Data can let you know the needs, pain points and desires of your prospective audience before you launch
  - When you tailor the value and features of your products to match what consumers are looking for, you'll have better product success
- **Increases opportunities for cross-selling and up-selling**

Benefits of data driven marketing

Provide a better experience for your customers

Identify customer issues with social listening

Authenticate customers with biometrics

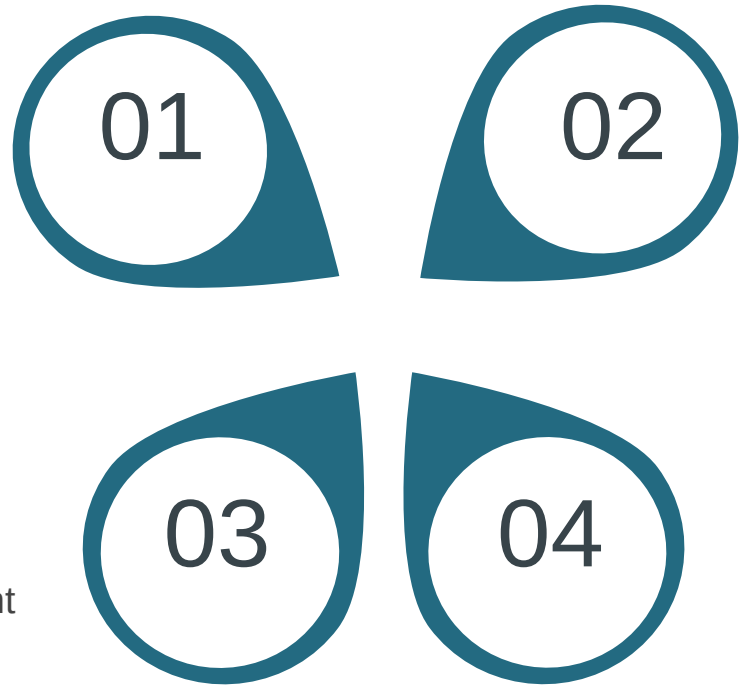
AI Chatbots

Voice Payments Technology in banking

Descriptive versus explanatory versus predictive analyses

Descriptive Analysis

- Give quantitatively and statistically summarize the information of dataset
- Distribution of your data
- Detect typos & outliers, correlation…



Explanatory Analysis

- This type of analysis is conducted when you have a specific question that you want to answer
- Answer why using data

Predictive Analysis

- Predict a specific future event using the historical data

Prescriptive Analysis

- Prescriptive analytics focuses on finding the best course of action in a scenario given the available data.
- It emphasizes actionable insights instead of data monitoring

What types of analysis will you conduct?

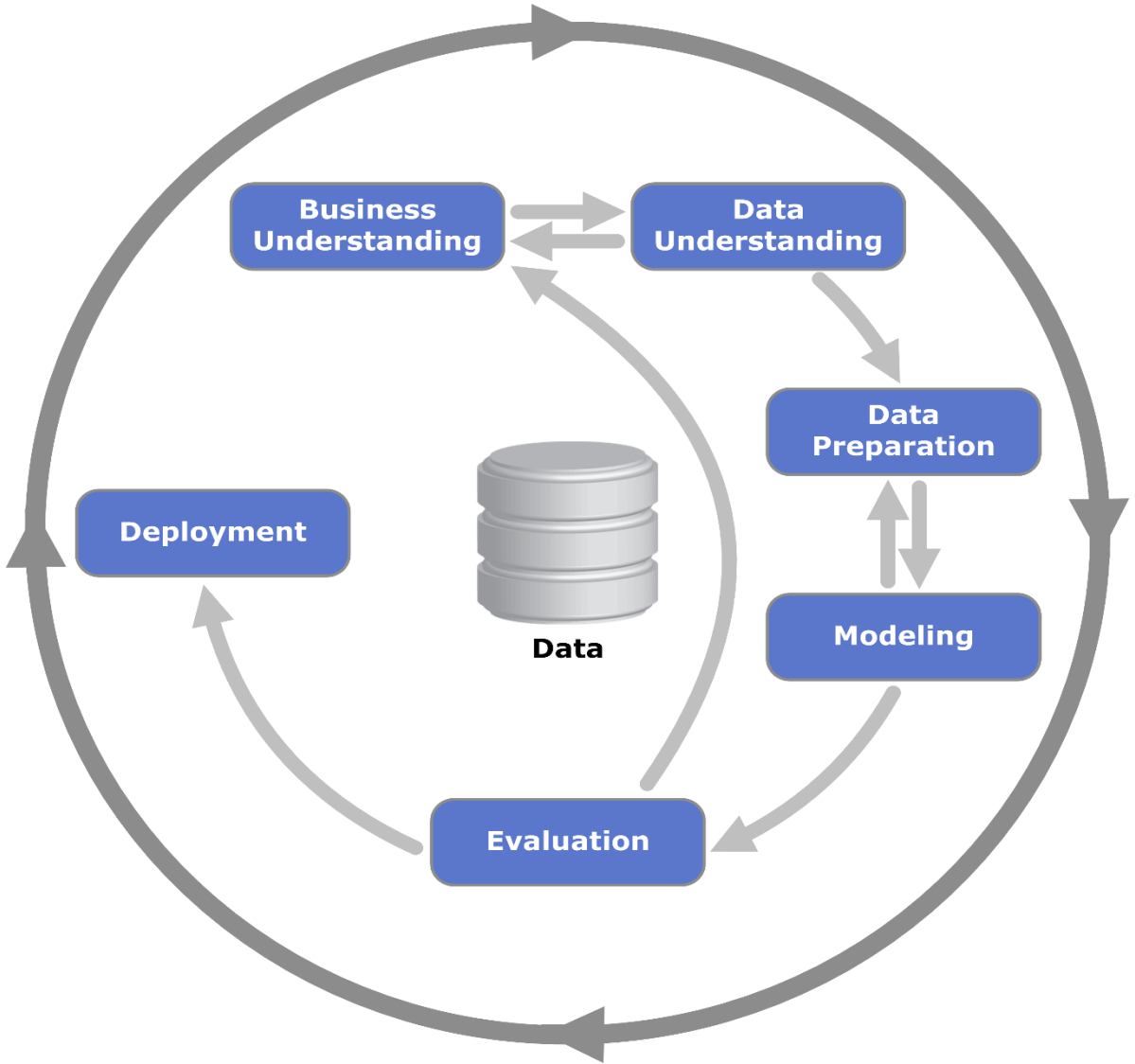
1. What is the best selling item?
2. What were the monthly sales like in the past year?
3. What is the average price of the items that are sold?
4. What drives your users to make purchases?
5. What drives users to engage with our marketing campaigns more?
6. Which user is the most likely to make a purchase within the next seven days?
7. Which item user will buy next week ?

Types of machine learning algorithms

- **Supervised learning algorithms:**
  - The prediction target is known.
  - Such algorithms attempt to learn a function that approximates the relationship between the features values and the labels in a way that it can be able to generalize well to new unseen data.
  - Example: Linear Regression, Random Forest, LightGBM…
- **Unsupervised learning algorithms:**
  - We don not have a specific prediction target.
  - Is used in clustering and recommendation systems
  - Example: kmeans Clustering, Hierarchical clustering, Principal Component, Association Rule…

Data Science Workflow

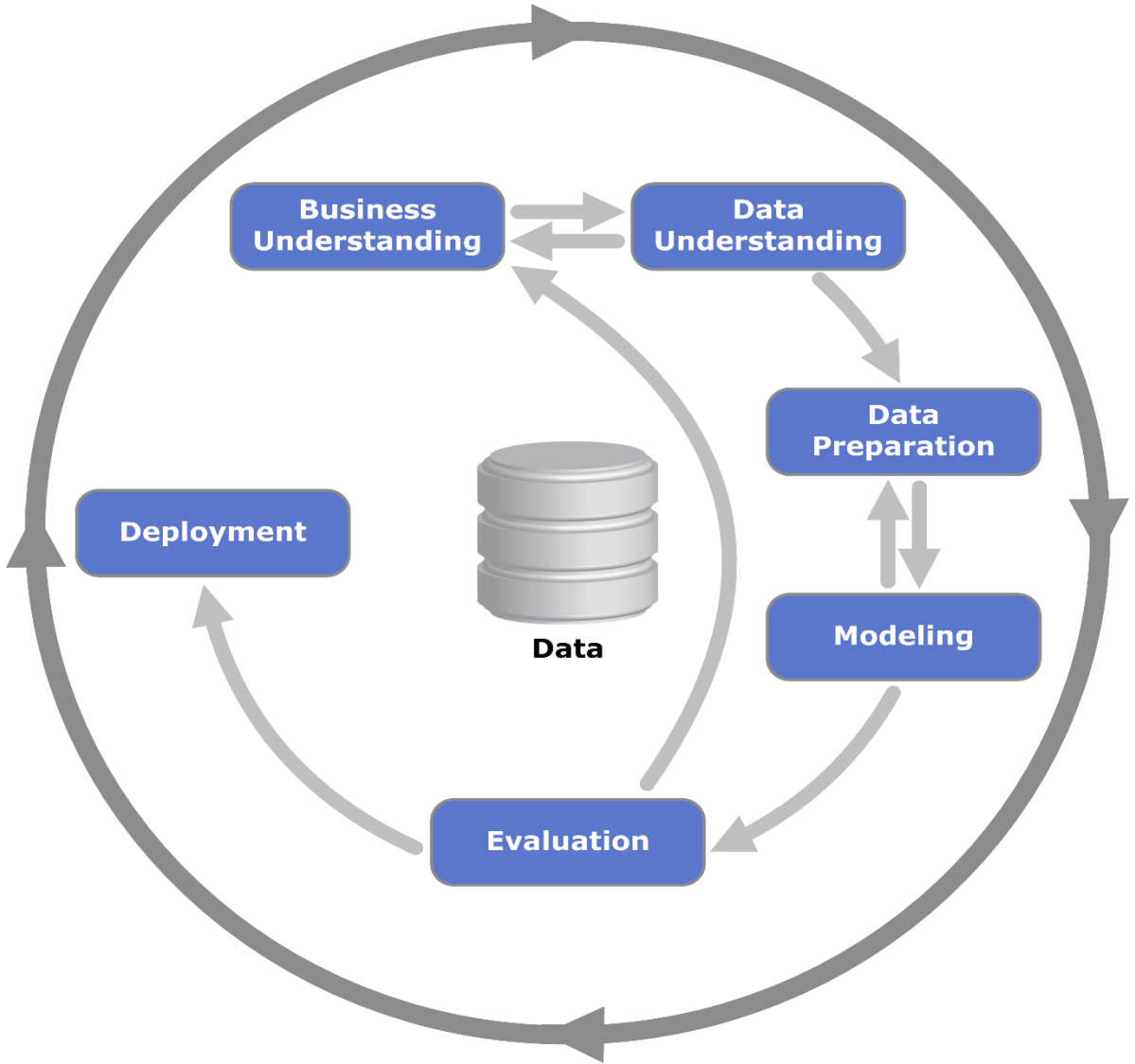
Cross Industry Standard Process for Data Mining



- **Business Understanding**: Define project objectives, translate business requirements to data science problems
- **Data Understanding:** Summarize the data by identifying data column, total number of variables in data, identify data quality problems, discover first insights
- **Data Preparation:**
- Create features from raw data, cleaning data, transform data. After this step we have a ready dataset for modeling.

Data Science Workflow

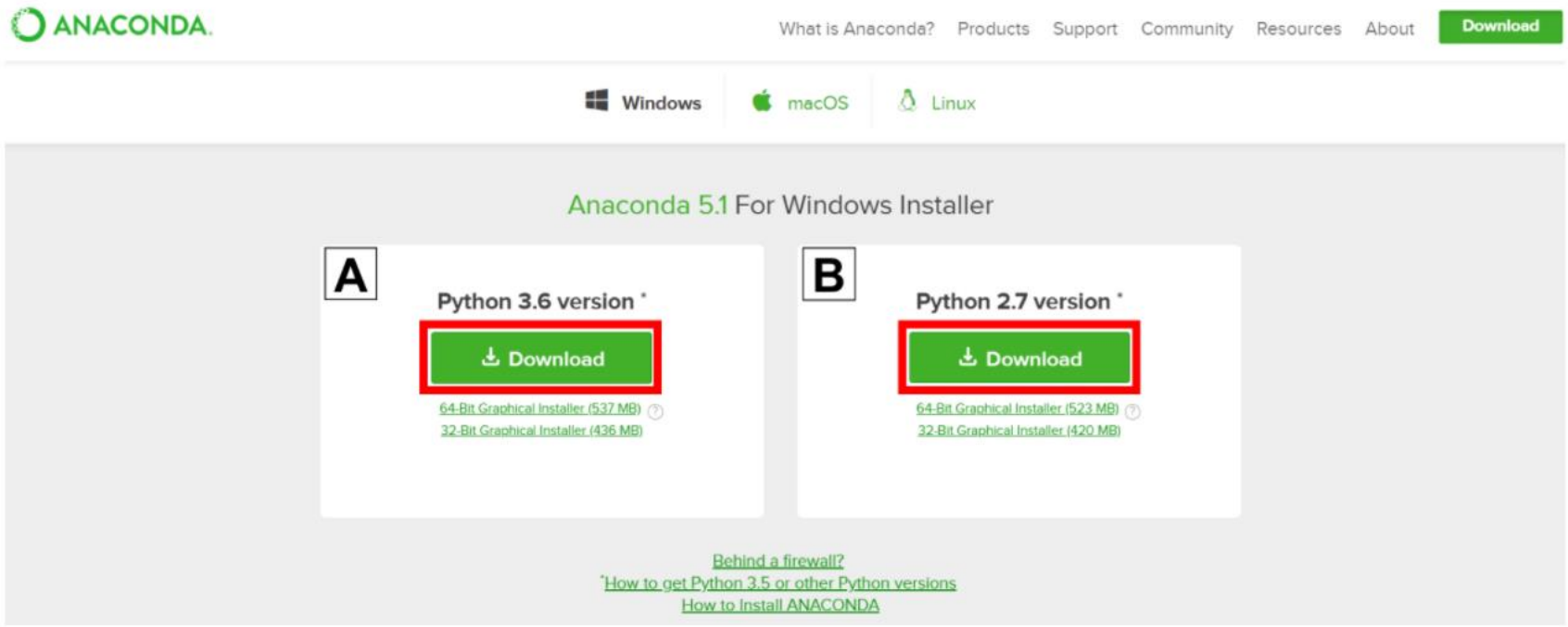
Cross Industry Standard Process for Data Mining



- **Business Understanding**: Define project objectives, translate business requirements to data science problems
- **Data Understanding:** Summarize the data by identifying data column, total number of variables in data, identify data quality problems, discover first insights
- **Data Preparation:**
- Create features from raw data, cleaning data, transform data. After this step we have a ready dataset for modeling.

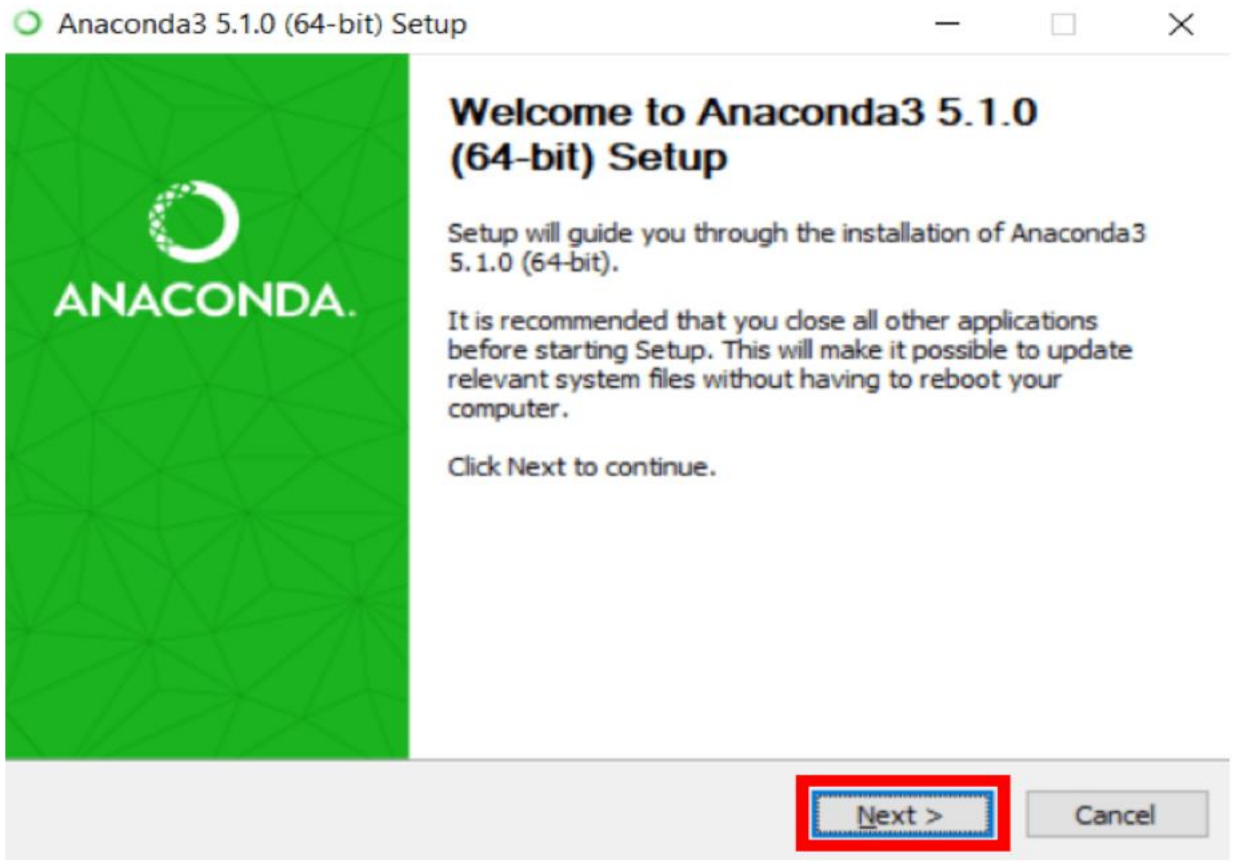
Setting up the Python environment

1. Go to the Anaconda Website and choose a Python 3.x graphical installer



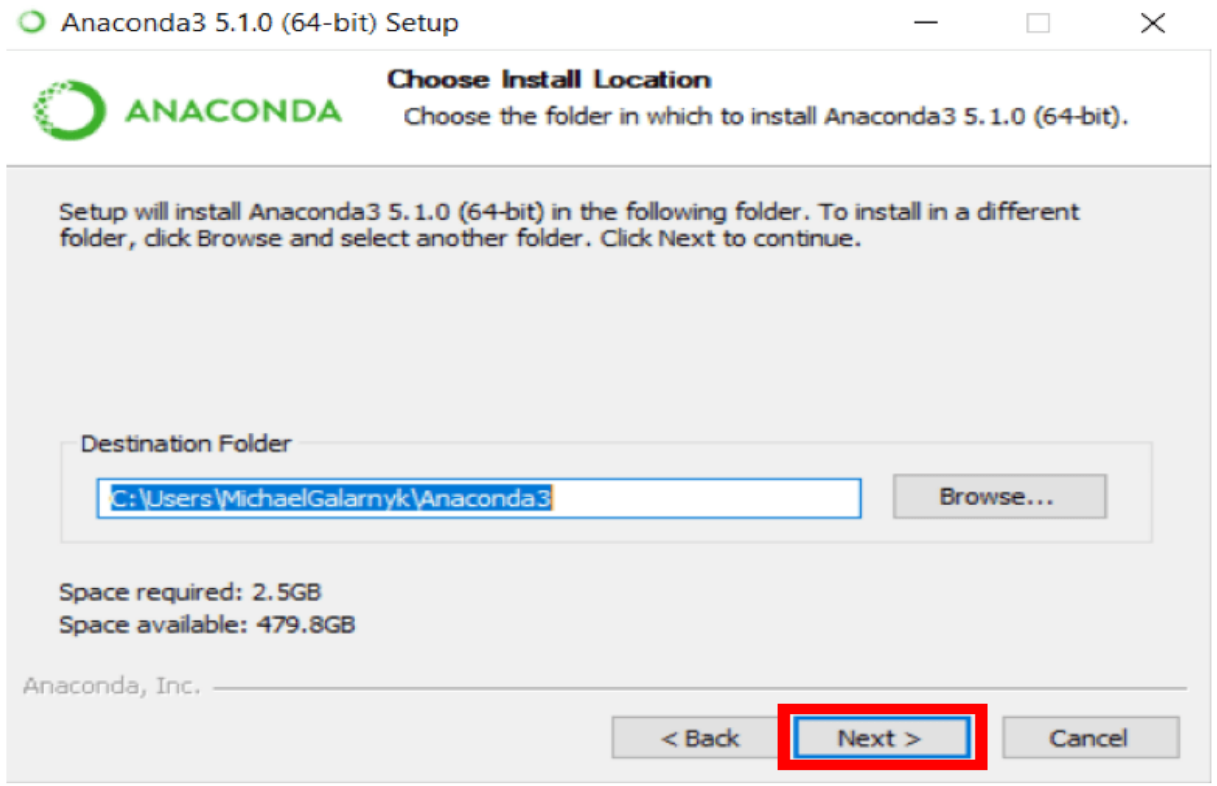
Setting up the Python environment

2. Locate your download and double click it
3. When the screen below appears, click on Next



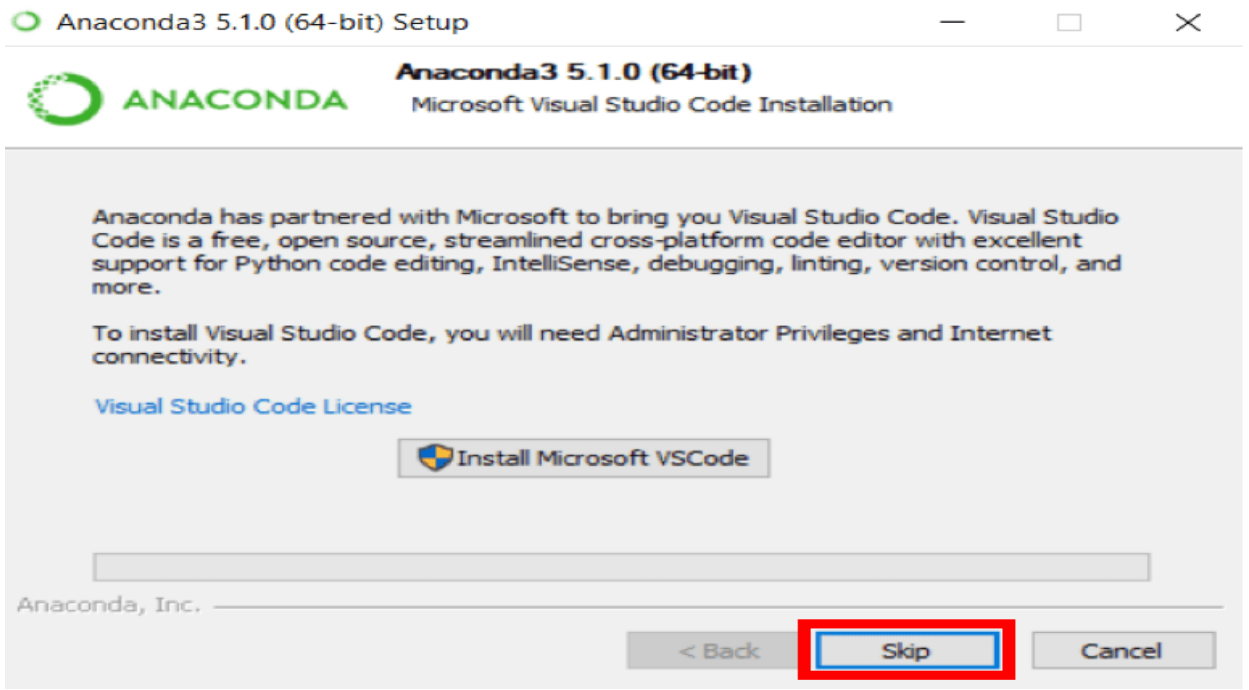
Setting up the Python environment

3. Read the license agreement and click on I Agree
4. Click on Next
5. Note your installation location and then click Next



Setting up the Python environment

8. You can install Microsoft VSCode if you wish, but it is optional



9. Click on Finish